DOCUMENT RESUME

ED 310 721 IR 013 754

AUTHOR Coffey, Michael A.; And Others
TITLE Maintenance of Microcomputers. Manual and Apple II Session, IBM Session.
INSTITUTION Missouri School Boards Association, Columbia.
PUB DATE 87
NOTE 58p.
PUB TYPE Guides - Non-Classroom Use (055) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Computer Peripherals; *Computer Printers; Computer Software; *Computer Terminals; Disk Drives; *Equipment Maintenance; Floppy Disks; *Microcomputers
IDENTIFIERS *Apple II; *IBM Personal Computer

ABSTRACT

This guide describes maintenance procedures for IBM and Apple personal computers, provides information on detecting and diagnosing problems, and details diagnostic programs. Included are discussions of printers, terminals, disks, disk drives, keyboards, hardware, and software. The text is supplemented by various diagrams. (EW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED310721

MICROCOMPUTER MAINTENANCE

MANUAL AND APPLE II SESSION BY

Michael A. Coffey
Educational and Business Microcomputer Consultant

IBM SESSION BY

J. Rick Mihalevich
Director of Computing / Technology Services, MSBA
AND
Mike McClaskey
Coordinator of Computing / Technology Services, MSBA

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

J.R.Mihalevich

M.J. Dyrenfurth

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

IR013754

BEST COPY AVAILABLE

MAINTENANCE OF MICROCOMPUTERS

"Most preventive maintenance is simply common sense. You do not need a bench full of expensive test gear, neither need you be a computer expert. All you need is your nose, your ears, a lint free cloth, a pencil eraser, maybe a little fine lubricating oil, and most of all, the desire to keep you system up and running."

Les Solomon

"About 90% or better of all the things that go wrong with technological devices, the average person could fix easily"

20% could be prevented.
60% you can fix yourself.

USA Today article

© Michael A. Coffey 1987

Computer Selection

The selection of computer hardware can be governed by what is called The Three S's:

1. Availability of SOFTWARE (and peripheral devices) by the manufacturer and independents.
2. Commitment to user SUPPORT by the manufacturer.
3. Widely available repair SERVICE.

THE COMPUTER

The computer proper is the part of the system that generally requires the least care and maintenance. It is relatively immune to dust, shocks, and vibrations

Preventive maintenance

1. KEEP LIQUIDS AWAY FROM A COMPUTER!

2. Electrical interference. The computer needs a constant regulated power supply.

A) There are **five major sources of trouble** on the power line:

Blackouts

Brownouts

Long-duration transients

Short-duration transients

High frequency interference

© Michael A. Coffey 1987

A study done by IBM scientist for a typical computer:
Total number of power line disturbances: 128.3/year

Voltage outages	.5%
Undervoltages	11.0%
Voltage surges	39.5%
Voltage spikes	49.0%

B) Protection devices

Surge protection (line filters)

Line conditioners

SPS

UPS

C) Static electricity - up to 60% of service call on equipment is due to static electricity.

Some of the **possible effects** of inducing a static charge into an operating computer are:

a) Computer to freeze
b) Garbage to be read from or written to the disk
c) Cursor to freeze
d) Diagonal lines to appear on your monitor
e) Memory to be wiped out
f) Chips to be destroyed

Where do we find static charges:

1. Environment

a) Floors and carpeting
b) Work surfaces

© Michael A. Coffey 1987

2. Equipment

   a) Equipment cases and surfaces
   b) Chairs, carts storage cabinets
   c) Copiers and printers
   d) Pastics and packaging

3. Material

   a) Paper supplies

4. People

   a) Clothing that is rubbing as we walk
   b) Your feet and a rug
   c) You and the cloth covered chair

Static Prevention:

a) Humidifiers

b) Anti-static sprays

c) Anti-static mats (2 types)

1)

2)

d) Anti-static carpets

e) Mop floor with anti-static solution to give protection up to 6 months

f) Touch a grounded metal object before using computer

   1) Desk lamp

   2) Door handle

Grounding:

3) Dust

Dust is the ghost that haunts your computer and keyboard and can scare your machine into not working correctly. Dust is to computers what plaque is to teeth and arteries: it builds up and eventually damages the surface.

© Michael A. Coffey 1987

4) Cooling (Overheating)

Possible solutions:

a) Check to see if any ventilation slots and expansion slots are not obstructed.

1) If they are, a hot spot is occurring inside the computer.
2) Add on circuit board should have 1/4" to 3/8" between the top of the circuit boards and the cover of the computer to allow for proper airflow.

b) Commodore:
C64 - remove the foil shell which covers the circuit boards of the newer C64's since this traps heat, but voids warranty. The foil is designed to reduce RF interference Maybe add a fan. 1541 - take off cover or install lower power CMOS chips to decrease current loads and thus heat.

c) Consider a fan (or a second fan for PC)
1) If you put more than 3 cards in an Apple II+ you should install a fan.
2) If you put more than 2 cards in an Apple IIGS you should install a fan.

Recommended operating temperature by manufacturer

IBM PC	-	60 to 90 degrees F
Apple IIe	-	40 to 110 degrees F
Epson QX-10	-	50 to 95 degrees F
Sanyo MBC 1000	-	50 to 95 degrees F
Osborne 1	-	32 to 85 degrees F

When something goes wrong

A) **Pollution** will corrode the contacts of connectors and components.

1) Use an eraser to clean the contacts of the interface circuitry. Do not clean it over the computer
2) Use clean non-linting cloth with some rubbing alcohol on it.
3) Tobacco causes rapid oxidation of connections and therefore increases the possibility of problems.

B) Bad looking fuse.

C) Check for **loose chips** inside the computer.

D) Check if the computer was **stored** in a too cold or too hot place.

1) Loose chips or wires?
2) IBM PC - designed to be stored between 50 and 110 degree

© Michael A. Coffey 1987

E) Use too many electrical devices on one circuit?

F) **Power Supply?** - Leave it to an experienced repair person.
Some computer power supplies are inadequate with some any add-ons.

C64	-	with almost any add-on.
IBM PC	-	with a hard disk (note use of 135 Watt power supply by PC compatibles.
Apple II +/e	-	with more than 2 Apple RAM cards.
Apple IIGS	-	with more than 2 cards

MTBF (mean time between failure): on an Apple IIe it is 20,000 hours

THE PRINTER

Dot matrix	-	speedy, low cost
Thermal	-	usually for graphics
Daisy wheel	-	letter quality & slow
Chain	-	high speed dot matrix
Jet ink	-	quit and fast
Laser	-	highest quality

In most computer systems, the printer is the device that has the largest number of mechanical parts. It is therefore the device most likely to fail, particularly with rough or improper handling.

Preventive maintenance

A) Printer stability

B) Paper path clearance

C) Environment

© Michael A. Coffey 1987

D) Maintenance

1)

2)

3)

E) Train operators properly!!!!!!

When something goes wrong

a) Switch/button(s) incorrectly set?
b) Paper jams / out of paper / paper set for pin feed when it should be friction or vise versa.
c) Electronic failures (pulled plug?)
d) Broken ribbon?
e) Broken printing element or advance mechanism?
f) Bad fuse? (some printer have a fuse)

MTBF (mean time between failure): on my Okidata 92 it is 4000 hours

Printer Related Topics

A) **Oiling** ImageWriter

B) **Re-Inking** Printers:

1) Ribbon re-inkers

2) Alternate methods:

a) Commercial spray

b) WD-40

© Michael A. Coffey 1987

My conclusion:

C) SHEET FEEDERS

"A sheet feeder is a delicate mechanical marvel and needs to be treated with care."

Preventive maintenance

1) Paper - be careful about the kind and quality of paper used.

   a) Usually feeders require typing quality paper between 16 and 24 pound stock with 18 or 20 pound stock paper generally working best.
   b) Problem paper examples would be:

      coated paper.....(too slippery)
      onionskin paper.....(too light)
      multipart forms.....(too thick)
      sheets of pressure sensitive labels .....(all of above)

   c) Best paper is that designed for copiers - they survive a more complex feeder.

2) Envelopes

3) Other tips:

   a) Always fan a new batch of paper on both left and right sides before use and align it correctly in the feeder.
   b) Store paper properly:

      1. Store you paper flat since curved paper is more likely to jam.
      2. Humidity can swell up paper causing feeding problems.

c) Do not reuse paper that has been through a feeder before. There is a higher chance of it jamming.

© Michael A. Coffey 1987

THE CRT (MONITOR)

The monitor imposes no difficult requirements, such as a dust-free environment or very clean electrical power; and it requires almost no maintenance. In fact, neglecting it **usually** has no visible adverse impact.

1) **Screen**

Preventive maintenance

a) Do not touch the screen with a pen/pencil, etc; which could scratch. Silk screens are the worst.
b) Wipe the screen with treated cloth to keep down dust. There are many anti-static sprays and cloths on the market. OR

   1) Use mild soap and water with a soft cloth for drying.
   2) Use one part fabric softener to three parts water.

c) A dusty screen exclaims a message to all who see it.
d) IBM - Do not plug the Monochrome Display into Color / Graphics Adapter which also has a 9-pin D shaped connector

When something goes wrong

a)

IF IT IS NOT: Then you need a trained service technician. The only adjustment you should attempt are those that can be accomplished from the **outside** of the monitor. The voltages inside a monitor or TV set run as high as 25,000 volts. It's best to stay clear of the inside.

Some Possible Problems

a) Humming noise - possible short inside.
b) Poor intensity control, bright blurry characters - tube age (center of screen is worn)

© Michael A. Coffey 1987

HARD DISKS & FLOPPY DISK DRIVES

CAUTIONS ON DISKS

ON USING 5.25 AND 3.5" DISKS:

1. **Use quality disks.**
2. **Store disk in a cool, clean place.**
3. **Back up all important files / disks.**
4. **Store working disks and backup disk in different places.**
5. **Never allow smoking near your disks or computer.**
6. **Never set a disk near anything with a screen or buttons.**
7. **Insert the disk carefully into the disk drive.**
8. **Use only on label.**
9. **Keep the working area around a disk (and computer) as clean as possible.**

ON USING 5.25" DISKS:

10. **Never touch the disk surface.**
11. **Never slam the disk door closed on a disk.**
12. **Store 5.25" disks in their protective jacket when not in use.**
13. **Write on a label already on a 5.25" disk with only a felt tip pen.**
14. **Don't bend or fold disks.**
15. **Store disks vertically.**

© Michael A. Coffey 1987

16. Use both sides of the 5.25" disk on a one side system with caution.

Some of the many, many symptoms of disk misuse are:

1) Disk drive failures
2) Memory losses
3) Incorrectly processed data
4) Haywire video displays

When something goes wrong

a) No data back up? (make extra copies of important data)
b) Drive speed not within limits?
c) Dust or bugs crawling into drive?
d) Dirty drive head?
e) Floppy disk bad due to incorrect maintenance?
f) Drive alignment of read/write head out?

1) This is very common on Commodore 1541 drives.
2) An incorrectly connected old style Apple Disk II drive cable will FRY from one to three chips on the circuit board in the drive on power up.

g) Problem with Apple drive:

1. A sickly sweet burnt odor around drive:
2. Random reading/writing.
3. Disk spinning-no smell.
4. Disk spinning-no smell on Duodisk or Unidisk

h) There are some programs that will not work with disk controller cards other than Apple's.

MTBF (mean time between failure):

Drive Related Subjects

A) Drive head cleaning

1) Two ways to go about this:

a) Use a commercial cleaner.

b) Use alcohol and a lint free material around a cotton swab.

2) How often? - It depends on how much you use your drives.

© Michael A. Coffey 1987

B) **Disk dive alignment**

C) **Hard Disks**

1) Set hard disk head back at end of drive.
2) Old IBM program to set back head only works on 10M hard drive, it sets head to middle on a 20M

D) **Temperatures**

Hard disk maintains operating temperature by convection cooling and needs two inches on each side and nothing on top.

Information on different peripherals

XEBEC Streaming Tape Subsystem

Operating	10	-	40 deg C	
Storage	-25	-	69 deg C	
Humidity	20	-	80%	
Altitude	-200	-	1500 ft	

XEBEC Hard Disk

Operating	0	-	50 deg C	
Storage	-25	-	69 deg C	
Humidity	10	-	90%	
Altitude			10,000 ft	

HyperDrive

Operating	10	-	35 deg C	(50 - 95 deg F)
Storage	0	-	40 deg C	(32 - 104 deg F)
Humidity	10	-	80%	
Shock operating			10g	
Non-operating			40g	

Apple HD20

Operating	10	-	40 deg C	(50 - 104 deg F)
Storage	0	-	50 deg C	(32 - 122 deg F)
Humidity	20	-	80%	(non-condensing)
Altitude	-1000	-	10,000 ft	

Key tronic Bar Code Keyboard

Operating	20	-	40 deg C	
Storage	-40	-	70 deg C	
Humidity			95%	(non-condensing)

© Michael A. Coffey 1987

SOFTWARE INCOMPATIBILITIES

Sometimes it is the software that will not work with your hardware.

HARDWARE INCOMPATIBILITIES

Sometimes it is the hardware that will not work with your software.

A) V-Series Chips by NEC (Nippon Electric Corp.)

V20, V30 8088 replacements
V40, V50 16 bit
V60 32 bit

V Chip problems

B) Substandard Components

© Michael A. Coffey 1987

SERVICE CONTRACTS

Murphy's Law: your computer is likely to break down at two times:
When you need it...and when you desperately need it.

TPMs (Third Party Maintenance vendors)

With a service contract from a vendor, which is essentially a casualty and life insurance policy on your equipment, you have the choice of (in descending order of cost):

1. On site service with a number of available response times.
2. Pick up service.
3. Carry in service.
4. Over night parts exchange, mail in service.

Questions to ask:

1. When does the coverage begin - immediately or after the manufactures warranty expires?
2. What exactly does the contract cover?
3. Can you purchase the contract after you have had the equipment for a while? If so, do you have to bring it in for inspection at an additional cost?
4. How much does the contract cost after the first year? Can these prices be raised?
5. Can renewal be refused? If so, under what conditions.
6. If you sell the equipment, is the buyer covered?
7. Must your entire system be covered? Can you add or delete hardware?
8. Will you be given a loaner if the equipment takes longer than a certain time for repair. What cost is there for a loaner?

CONTRACTS - COMPANIES

AppleCare
Avalible from any Apple Dealer for any piece of Apple hardware.

Spectavideo Inc.
A national customer service program though Serviceland Computer Services Inc. for the Bondwell line of CP/M and MS-DOS based computers.

TI-Care
From the Data Systems Group of Texas Instruments Inc. Now available for the TI Business - Pro and Business Systems Series 100, 300, and 600. Highlights include a guaranteed 4hr response to service calls withi 50 miles of specified service locations, guaranteed systems uptime and reduced rates compared to the previous service plan.

NOTE: If your computer is still under warranty, you'll invalidate it by disassembling or performing any repair work.

© Michael A. Coffey 1987

Computer Resolutions

by Michael A. Coffey
(inspired by William O'Brian)

For the safekeeping of my system:

1. Champagne, confetti, and streamers are good for me but not for my CPU. I promise I will keep the party away from my computer system.
2. I will keep my computer system properly covered.
3. My disks will receive the best of care.
4. I will faithfully make backups of anything that I: do not want to retype, do not have time to retype, can not afford to pay to have retyped.
5. Once each year, I will clean the read / write head in my disk drive using a nonabrasive cleaner kit designed for my computer.
6. Three or four times a year I will clean the interior of any computer system that I can take the lid off and clean the exterior, including the keyboard. I'll use only a damp cloth on the exterior and never spray or pour cleaning solution on it. My printer will get the same treatment.
7. Every six to twelve months, I will clean the edge connectors on the interface cards with alcohol and a swab.

Of all the resolutions I make this year, I will keep at least these seven since I love my computer and prefer not to spend the money on a replacement.

Name:

Date:

© Michael A. Coffey 1987

THE COMPUTER ROOM

The NIOSH Report (1981)

(The National Institute of Occupational Safety and Health) and a few other research studies can give us some guidelines:

CHAIR:

LEG CLEARANCE:

FOOTREST:

KEYBOARDS:

DESK SPACE:

VIEWING DISTANCE:

VIEWING ANGLE:

© Michael A. Coffey 1987

LIGHTING LEVEL:

REFLECTIVE GLARE:

1.

2.

3.

REST BREAKS TO RELIEVE STRESS:

SOUND:

© Michael A. Coffey 1987

CHECKLIST FOR MICROCOMPUTER LABS

"You need to put your computer in its proper place"

Dara Pearlman
PC Magazine, Sept. 3, 1985

This checklist cannot be considered complete. It requires ongoing refinement, updating, and expansion and may cover areas that will not be needed in your computer lab:

_____Screen
1. Screen and keyboard in front of each other
2. Can the screen be tilted, raised, lowered
3. Is the top of the screen just below eye level
4. Angle, height, viewing distance

_____Operator furniture
1. work space next to computer
2. Rollers on chairs
3. Four or five coasters on chairs
4. Adjustable chairs with backs
5. Legspace
6. Pedestals or footrests needed
7. Keyboard height

_____Lighting
Reflective glare is undesirable since it causes eye fatigue. To eliminate reflective glare, there are three steps:

1. Windows should be shaded
2. Screens should be positioned so as not to reflect windows or overhead lights
3. The viewing direction of the user should run parallel to light sources and avoid direct glare

If reflective glare is still present, there are remedial steps:

1. Full or partial screen hoods may be fitted
2. Anti-glare filters may be attached to the screens
3. Fluorescent light fixtures may need to be recessed; baffles may have to be added to Cause more even diffusion of light by directing the light downward
4. An indirect lighting systems may have to be

_____Sufficient soundproofing
1. Printers may be noisy.
2. Carpeting, special anti-static

_____Cables of sufficient length on equipment
1. Prevent pulling out of cables
2. None exposed, preventing tripping, etc.

© Michael A. Coffey 1987

_____Electrical circuits installed
1. Outlets in close proximity to the equipment they power
2. Grounds available
3. Circuit breakers
4. Surge protectors, etc
5. Extra electrical outlets for later expansion

_____Environment
1. Seal all windows or have screens for minimum protection
2. Reduce traffic through room
3. Keep coat racks outside room or near, but not next to computers
4. No dust, liquids, smoking... (any signs saying this?)
5. Air conditioning needed?

_____Humidity / temperature indicators

_____Minimal supplies kept near but not in the way
1. Printer paper, blank disks, felt tip pens, etc.

_____Phone lines(s)
1. For modems, etc

_____Space for access and maintenance of the equipment

_____Static control (floor coverings / spray / mat)

_____Storage cabinets
1. Disks, documentation, printer paper, supplies, etc
2. Locks cabinets for storage of valuable software

_____Sufficient room available
1. Can the handicapped get at computers and printers

_____Bulletin board
1. For notices, adds, current news

_____Name plate
1. Indicating the person currently in charge in the lab

_____Cleaning materials
1. Stored in a cabinet

© Michael A. Coffey 1987

Preventive Maintenance For A Network

(Derived from the March 1987 issue of LAN by Gary Baker)

Hardware Maintenance

1. **Visually check cables.**
   Examine all exposed cables for possible problems: i.e. a worker's desk leg sitting on top of a cable, or one that is too close to a heater.

2. **Electrically check the cable.**
   You can not visually check all cables. An ohmmeter can give you an idea of whether or not your coaxial installation is intact. With one lead on the center wire and the other pressed to the braided outer shield conductor, the meter will give an impedance reading. A reading around the cables rated impedance indicates O.K. A higher reading might mean a nick in the cable - which could develop into a full fledged break. A low impedance means there is a short or the cable has been crushed to the point that both conductors are touching each other.

3. **Test NIC's (Network Interface Cards)**
   Many LAN's have diagnostic packages for testing and spotting problems before they become major.

4. **Keep an eye on the file server.**
   Some network operating systems have software that record errors of different types.

5. **Watch the system and learn.**
   Get a good idea of how the system acts when its running right. i.e. average response time.

Disk Maintenance

6. **Back up the system.**
   Backing up a server disk in imperative. A single disk crash can spell the end to everyone's work!

7. **Periodically rebuild the whole server disk:**
   Hard disk become fragmented, causing the disk drive to do more movement to access a file which causes:

   longer access
   increase number of soft errors
   more wear and tear on the read/write head mechanism

8. **Don't overload your disk.**
   When a hard disk gets about 70% full, performance goes way down and the drive mechanism suffers. This is due to the extra work caused by file fragmentation.

   a) Either buy a new larger hard disk drive or additional hard disk drive
   b) Start deleting files you no longer need and then run a program that compacts files on the disk.

9. **Keep an eye on disk utilization.**
   If you have more than one file server, distribute heavily used files among them in order to help prevent crashes caused by drive overwork.

© Michael A. Coffey 1987

© Michael A. Coffey 1987

LAN DIAGNOSTICS: Hardware Diagnostics

10. Check the NIC (network interface card)
If a single micro is causing problems, first check the NIC. Most networks come with a diagnostic program. If there is none, replace the card with a known good one and see if the problem goes away.

11. If it isn't the card, check the drop cable.
Make sure the cable is tight by unplugging and replugging connections.

12. Check the trunk cable.
Use an ohm-meter for breaks in the cable.

13. Narrow down the problem.
If still having problems, slowing start to disconnect more and more of the computers in order to isolate the cause. Remember that the micro that's experiencing the problem isn't always the one responsible for it.

14. Check the server.
Run any diagnostics on the server.

LAN DIAGNOSTICS: Software Diagnostics

15. Reinstall the operating system
When all else fails, reinstall the operating system from scratch.

© Michael A. Coffey 1987

A rewritten adaption from

"When Your PC Doesn't Work"

originally by Gene B. Williams

When you buy an IBM PC, you get two diagnostic aids to help you spot many of the possible causes of malfunctions. The first is POST and the second is a diagnostics program in the back of the Guide tc Operations.

The IBM folks did not include sufficient instructions on how to use these. But take heart. These two methods of testing, coupled with some simple steps and common sense, tell you exactly what has gone wrong and where, for about 95% of all malfunctions. Chances are good that you can find and fix what appears to be a major failure with little more than your fingers.

1) POST (Power On Self Test)

The self test cycle the IBM goes through at power on. It is a quick check of th e:

System board (mother board)
RAM
Power supply
Keyboard external
Chassis
Some of the adapter cards

During this testing cycle nothing shows on the screen, nor is there any indication that anything is happening unless POST finds a malfunction, whereas you get an error code and /or audio signals.

The next time you begin working at the PC, pay attention to the sounds of the normal boot sequence. Make this part of your normal routine.

If everything works correctly, the cursor begins blinking on the screen a few seconds after you turn on the power. It continues to blink during POST. The light on drive A comes on, there is a single short beep, and the LED goes out momentarily. When it comes on again, the program load. Anything other than this sequence indicates that there is a problem.

2) Regular diagnostics

One mistake many people make is to use the diagnostics program only when a malfunction occurs. This is somewhat like going to the doctor only after you're seriously ill. You should use the diagnostics program as a preventive check. If something is starting to fail, the program might spot it before it becomes a serious problem.

The diagnostic disk that comes with the PC does much more than does POST. Table 2 list the primary error codes generated by the diagnostics program.

The primary difference between these and those given by POST is that the diagnostics program generates a code even when a particular system or circuit is operating properly. POST does not. This successful completion code ends in all zeros. (For example, when the system board successfully completes testing, a 100 code is generated, while properly operating floppy disk drives give a 600 code.)

Table 3 is a step by step procedure for the diagnostic test. If you monitor is not working, you can go

© Michael A. Coffey 1987

by the sound alone.

Table 1

Contains all the primary error codes, signals and symptoms generated by POST. x means any number

SIGNAL OR CODE	MEANING
Nothing happens	Power supply or ?
Continuous beep	Power supply
Repeating short beeps	Power supply
1 long beep, 1 short	System board
1 long beep, 2 short	Monitor
No display	Monitor
Cassette BASIC Display	Disk drive (usually A)
101, 131	System board
201	RAM
xxx201 and Parity Check x	RAM
Parity Check x	Power supply
301, xx301	Keyboard
601	Floppy disk drive
1701	Hard disk drive
1801	Expansion chassis

Table 2

Diagnostics Program Codes

CODE	MEANING
02x	Power
1xx	System
20x	RAM
xxxx	RAM
30x	Keyboard
xx30x	Keyboard
4xx	Monochrome monitor
5xx	Color monitor
6xx	Disk Drive
7xx	8087 math coprocessor
9xx	Printer adapter
11xx	Asynchronous communications
12xx	Asynchronous communications
13xx	Game adapter
14xx	Printer
15xx	SDLC communications
17xx	Hard disk drive
18xx	Expansion chassis
20xx	BSC adapter
21xx	BSC adapter

© Michael A. Coffey 1987

Table 3

Diagnostics Disk Audio Run Through

1. Power is applied; cursor should blink during POST; short beep; program loads.
2. "Select on Option" screen (0-run diagnostics routines, 1-format disk, 2-copy disk, 9-exit to system disk); enter "0" for diagnostics routines.
3. "Installed Devices" screen; beep; enter "Y".
4. "Diagnostics Choices: screen (0 run tests one time, 1-run tests multiple times,, 2-log utilities, 9-exit diagnostics); enter"0" or "1"; program now proceeds through tests for the system board and RAM, and there will be a delay of up to several minutes; this delay will be followed by a short beep.
5. "Typemate" (keyboard test) screen; enter"Y"; short beep.
6. "Display Attributes" screen; enter "Y"; short beep.
7. "Character Set" screen; enter "Y"; short beep.
8. "80X25" display; enter "Y"; short beep.
9. "40X25" display; enter "Y"; short beep.
10. "320x200 Graphics" display; enter "Y"; short beep.
11. "640x200 Graphics" display; enter "Y"; press any key eight times, short beep, enter "Y".
12. Long beep-short beep signals beginning of drive tests. Insert scratch disk in drive A; press Enter; drive LED will light and drive will grind; two beeps; enter "Y".
13. Repeat step 12 for each drive installed (long beep, short beep, scratch in B, Enter, LED lights, grind, beep beep, enter "Y"); ignore results on RAM drives.
14. Short delay and a single short beep signals the end of a completed cycle.

© Michael A. Coffey 1987

YO YO DUCK DIAGNOSTIC PROGRAMS

IBM Ver. 1.1

© Michael A. Coffey 1987
14380 New Halls Ferry, #104
Florissant, MO 63033

SYSTEM REQUIREMENTS:

DOS 2.1 or higher. You should also put BASICA on this disk. This disk was designed for the IBM PC and XT style computers Some of these programs will work only on IBM PC and XT computers, and will give faulty information on the AT. Most of these programs will work on IBM clones. It will take your input to make this disk better.

WARRANTY

YO YO DUCK DIAGNOSTIC PROGRAMS and the documentation are distributed `AS IS' without any express or implied warranties whatsoever.

ABOUT Michael A. Coffey AND YO YO DUCK

I head up the technical support department for a microcomputer company, and I deal with several types of microcomputers. ('nuff about me) This disk is the result of my interest in microcomputer care and maintenance. Indeed, I write a column on the subject that is published several places. My first disk YO YO DUCK DIAGNOSTIC PROGRAM disk was released for the Apple II series computer. It is now in version two and is much more advanced than this disk. (But I have more experience with Apple systems.)

The programs on this disk were collected from a variety of public domain and personal domain sources. I have added here and there to the public domain programs. It is my intention that this disk would be used as an aid in the care and maintenance of microcomputers by my fellow computer users and was put together for fun and to help others. If you use the included personal domain programs I encourage you to send the requested donation to the author.

Now how did I come up with the name YO YO DUCK? You wouldn't believe me if I told you!

SHAREWARE

Yes, this disk is shareware. If you like it, would you consider a little $5.00 donation? It helps pay for putting it together and sending it out. In one 12 month period I made $12 and some cents from people sending in donations. (Gee, since disks cost me less now, maybe I'd double that amount this year!) Actually, the main reason that it's shareware is to get an ideal of how many people are using it, and frequently they make helpful comments. If you don't want to send me anything (and there is no requirement), I ask that you send a small donation to a local school. How about your old college next time they send you a letter begging for a donation. Schools always

need money toward buying software. Better yet, why not buy and donate an educational program for a local primary school!

Two different Apple II series versions of YO YO DUCK DIAGNOSTIC PROGRAMS are also available from the author.

COMMENTS

I always welcome comments. BUT, if you don't give a stamped self addressed envelope, there will be no reply.

PROGRAMS

ALIGN.EXE
ALIGN.DOC

Version 1.6 by John L Dickinson.

The ALIGN program allows you to move a diskette drive head to absolute track locations and operate the drive while checks and adjustments are made. Both 40 track single and double-sided drives are supported.

ALIGN is one of several tools needed to adjust and service diskette drives. The ALIGN program does not attempt to teach you how to do an alignment, but it isn't difficult if you have what you need. The documentation is very good and is nine pages only. In addition to this program, you should have:

a) The drive manufacturer's alignment and service procedures.
b) An oscilloscope (dual trace with triggered sweep).
c) A DYSAN double-sided analog alignment diskette for 40 track drives, 224/2A #800180.
d) Extension or external diskette drive signal and power cables are very helpful.

If you find the ALIGN program useful, a contribution will be appreciated. ($20 suggested.) This is sent directly to the author, (and NOT to Michael A. Coffey):

John L. Dickinson
2470 N. Tierr Verde Pl.
Tucon, Arizona 85749

ALIGNSHT.BAS

The IBM disk drive alignment program. Do not use this unless you know what you are doing. The program above is much more useful.

CHECKOUT.BAS

Ver 821210 By Hamilton Company.
This program allow you to test:

Parallel Ports (LPT1: -LPT3:)
Serial Ports (COM1: - COM2:)
CRT Display (SCRN:)
Dial Smart Modem (COM1:Time Check)
Impulse Dial Modem (COM1:Time Check)

Change Printed Message (Times: 1) (Col: 40)
Change Baud Rate (Set at 300)
Change Serial Handshake (,N,8,1,RS)

CLEAN2.COM
A program by Marty Smith for cleaning drives using commercial cleaning disks.
CLEAN2.DOC
The documentation for CLEAN2. Additional comments by Michael A. Coffey.
CLEAN2.TIP
Originally called CLEANDSK.TIP, this is a short discussion on cleaning your drive heads from PC Magazine with additional comments and different views by Michael A. Coffey.

COLORSEE.CLR
COLORSEE.BAS
Ver 5.2 This program will display, with an appropriate pause, the full array of colors for the IBM PC, along with the number used in the color program statement. The program will then continue to show the color, again with a display delay and number identification, the spectrum of colors on a full screen, SCREEN 1, WIDTH 40. The color/graphics board and a color monitor are required. COLORSEE.CLR is the original program. COLORSEE.BAS has these notes removed and is runnable under BASICA.

CONFIG.EXE
Gives information about your system, such as:
Current date
Current time
System unit: ROM version
Release marker date
8087 availability
# of K on system board
(may be incorrect on newer systems)
Memory Total installed
Total in I/O channel
Input/Output devices:
Which display adapter selected
# of drives
# of parallel and serial ports
Game port availability
Color card availability

CPUID.COM
This is version 1.38. It gives you information on the CPU:
Type (i.e. 8088)
NDP (present or not)
CPU (healthy or not)

CPUSPEED.COM
Called a CLOCK SPEED CHECKER, it gives you the clock speed of your computer. i.e. a PC or XT has a clock speed of 4.77 Mhz. This is handy for those of you with clones or speed up card to match what your computer does with what is advertised.

DRIVETST.BAS

Based on a program by Joe McDermott in an April issue of SVCS Newsletter and modified by Jim Server and Herb Shear (who eliminated fname array & added auto disk/directory full). The program creates a series of sequential files, writes them and reads them back for verification, meaning displaying the first 255 characters for asterisks, and then erases them. It takes about 20 minutes for a test. Use a blank formatted disk. List the program for a few extra comments.

HEADCLN.BAS

Version 5.2 of a drive head cleaning program with drive selection by GINACO. There is comment box that appears when you run it. The program BLUEMENU referred to by the program is a BASIC menu type program. This program is merely an alternate for CLEAN2.COM.

HALFDRV.DOC

Comments on `why buy' and installing half height drives. The original article was written for Houston's HAL-PC newsletter by Kauko Laurinolli. A few additional comments are by Michael A. Coffey.

PC-COLOR.BAS

Ver 5.2

Allows you to test a monitor before purchasing it or for testing yours. It checks the brilliance of the screen and demonstrates the color combinations which are available on the IBM PC. It permits the viewer to determine the clarity and resolution of the WIDTH 80 presentation (important if you plan to do extensive word processing or detailed programming). The program appeared originally in the Nov. 82 issue of PC Magazine, page 305 in an article called `Color Palettes and Color Chips' by Karl Koessell.

JOYSTICK.BAS

Simple program to display the joystick port values by Will Fastie and edited by David Reussow in the April 23, 1982 issue of Creative Computing. For a more complex version, see JOYSTEST.

JOYSTEST.BAS

A program to display the joystick port values by Will Fastie and revised by David Reussow. It gives more information than other programs, but may be too much for the average person.

PCSTATUS.COM

By John D Talcomer. Gives information on:

MEMORY:
- Planar
- Total
- Free
- From (location of free memory)

EQUIPMENT:
- Printer (# of ports)
- Serial Ports (# of ports)
- Floppy Drives (# connected)
- Game Adaptor (if available)

VIDEO: Initial Mode (# of columns, rows and graphic standard used)
- Current Mode
- Attribute @ Cursor
- Buffer Offset, Length

Video Page
Cursor Mode
6845 Mode
6845 Pallette
KEYBOARD BUFFER:
Capacity
Start
End
DOS VER
ROM VER
^C CHECK
DISK VERIFY:
FREE SPACE ON DISKETTE DRIVES
DISKETTE PARAMETERS
On Time
Off Time
Settling
Bytes/Sec.
Sec./Track
ENVIRONMENT SETTINGS:
Comspec
Prompt
Path

ROMREAD.BAS

This is a BASICA program which reads a ROM address and interprets it to display the IBM PC type (PC, XT, PCjr, unknown), ROM BIOS chip date and copyright year, and the IBM part number for the ROM.

The program was originally published in PC Tech Journal and created by Susan Glinert-Cole. The published listing contained several errors, corrected here by Tom Allen, Systems and Programming Manager for The Sunmark Companies, St. Louis, MO.

SEESWTCH.BAS

Displays the systems switches of your PC. Originally from the Utah Blue Chips IBM User Groups back in Dec '82. Says it now from the International PC Owners (IPCO). It probably won't work on the newer systems. Won't know unless someone writes me.

STICK.BAS

A very simple program that displays the joystick and paddle gameport values. Gives you 0's if you don't have anything connected.

TESTROM.BAS

This program is supplied by IBM to test the ROM bios chip date. If the date returned by the program is earlier than 10/27/82, a new ROM bios chip is needed. The new ROM bios chip permits the system switches to be set to permit 640k in the system.

VERDISK.COM

This fast program checks a disk for physical damage. The number of errors found is reported.

YO YO DUCK DIAGNOSTIC PROGRAMS

Version 2.1 (ProDOS)

© Michael A. Coffey 1984-7

Table of contents

---

1 Other Versions of YO YO DUCK
1. Copying Disk
2. Warranty
3. Opening Screen
4. System Requirements
5. Programs=
C.D.CONNECTION
MONITOR.TEST
DRIVE.CLEANER
D.HI.RES.TEST
DISK.TEST2
ENSONIQ.SOUNDS
HIRES.TEST
INSTRUCTIONS
IW2
JOY.PAD.TEST
KEYBOARD.TEST
MEMORY.TEST
PRINTER.TEST
SPEAKER.TEST
ZANNY.QUIT
6. Appendix
Appendix A / Differences between versions.
Appendix B / Printing out these instructions.
Appendix C / Procedures for testing systems.
Appendix D / Special Installer version.

OTHER VERSIONS OF YO YO DUCK

This version 2 series is in the ProDOS operating system an is for the IIe/c/GS - but some tests will work on the II+ wit 64K. The original version - still in DOS 3.3 - but great improved since it first came out - is up to V1.4 Contact the author below for information. Include a stamped self addressed envelope - otherwise no return information.

For IBM

An IBM version of YO YO DUCK DIAGNOSTIC PROGRAMS has been prepared. Contact author below for information. Include a stamped self addressed envelope - otherwise no return information.

For Apple IIGS 3.5 Inch

A 3.5 inch version is being prepared and will be ready when time permits. (And how much spare time do you have?) Contact the author below for more information. Include a stamped self addressed envelope - otherwise no return information.

Copying Disks

This disk is distributed as shareware. If you don't want this disk please erase it or give it to someone else. If you like this disk all I ask is a donation of $5.

Michael A. Coffey
14380 New Halls Fry #104
Florissant MO 63033

You are encouraged to pass a copy of this disk and documentation to another educator. The disk is unprotected and the utility disk that came with the any of the Apple II series computers will copy it without any trouble.

If you don't feel like making a donation then go buy and donate an educational software program to your local school.

Warranty

YO YO DUCK DIAGNOSTIC PROGRAMS and the documentation are distributed "AS IS" without any express or implied warranties whatsoever. Comments or improvements should be sent to the above address. No answer without a stamped self addressed envelope!

Opening Screen

The infamous YO YO DUCK! You can go directly to the main menu and skip the little ducky by pressing ESC right after booting the disk. No - I don't tell people how this disk got its name because who would believe it!

System Requirements

Apple IIGS none
IIe none for 128K, not all test work in 64K
IIc none

Apple II / II+ / III
There is another diagnostic disk (Version 1 series that is designed for these computers. However most of these tests are known to run trouble free on the II+ and the Apple III in emulation.

To LIST INSTRUCTIONS on screen:

CONTROL-S can pause a screen listing of these instructions and any key will continue the listing. again.

CONTROL-C does not break you out of the listing but starts the instructions over again.

Program Descriptions

* * * C.D.CONNECTION * * *

Useful for checking if the computer-drive connection is properly working. This disk will give a catalog of a disk. When finished you are returned to the main menu. If you return to the C.D.CONNECTION menu without cataloging the disk - then either you had a non ProDOS disk in the drive or you have a bad connection.

* * * MONITOR.TEST * * *

Special requirement= Some options require a Color monitor

Five tests=

HI-RES COLOR PATTERN TEST
Allows you to test for the proper color adjustment.
HI-RES CROSSHATCH TEST
Tests for proper screen alignment.
LO-RES KALEIDASCOPE DEMO
Just a demo.
LO-RES SKETCHING SCREEN (FUN)
Just for fun.
B & G TESTS
The B&G test shows proper NORMAL / INVERSE / FLASH / 40 column / 80 column / MouseText and a white test for checking for burn spots on the screen.

When finished you are returned to the main menu.

* * * DRIVE.CLEANER * * *

Special requirement= Commercial disk drive cleaning disk

As the read/write head of a disk drive performs its job an oxide coating builds up on it. Several vendors have developed cleaning disks that remove this coating from the read/write head however most have failed to provide a program or instructions to turn on and off the drive. This program will spin the disk drive of your slot and drive choice for 30 seconds. Upon running this program you will be asked for a slot number. Prepare the cleaning disk as directed and place it into the drive. Unless you have a special setup the normal slot is '6'. Choose either drive 1 or 2. The program stops after 30 seconds. When finished you are returned to the main menu.

* * * D.HI.RES.TEST * * *

Special requirements= 128K & color monitor

This places the 16 different double Hi-Res colors on the screen which allows for color adjustment of your monitor. When finished you are returned to the main menu.

* * * DISK.TEST2 * * *

Special requirements= 5 1/4 inch disk drive only

This test verifies a disk. i.e. to see if it is a good useable disk. If a disk fails to verify - the computer will crash. This is my first ProDOS version and it is very slow compared to the DOS 3.3 version.

* * * ENSONIQ.SOUNDS * * *

A demo of the ensoniq sound chip in the Apple IIGS.

* * * HIRES.TEST * * *

This test shows any vertical or horizontal distortion in your monitor. When finished you are returned to the main menu.

* * * INSTRUCTIONS * * *

This file is the documentation you are now reading. There is an option for printing out this file on the screen or to a printer. Neither of these use any formatting commands. For instructions on printing out this file in a formatted manner= see Appendix B. When finished you are returned to the main menu.

* * * IW2 * * *

This is a special In-house program for a company to show some of the capabilities of the ImageWriter II printer. When finished you are returned to the main menu.

* * * JOY.PAD.TEST * * *

This program tests the value range of your paddle or joystick which varies from 0 to 255. It also tests if the buttons are in working order.

After running this program move your joystick up and down and back and forth (or back and forth on both of the paddles). The value on the screen should vary from 0-255. It is common if it does not quite reach 0 or 255 or if the rate of change of the values when moving a joystick/paddle is not consistent. The reading for Paddle 0 and 1 are for the first set of paddles and Paddle 2 and 3 are for any second set that is connected. Press the spacebar to exit the program. When finished you are returned to the main menu.

* * * KEYBOARD TEST * * *

Verifies the keyboard keys on the following=

IIGS or IIe Platinum
IIe upgraded to a IIGS without the new keyboard
IIc

(For a II+ keyboard test use a Version 1 series of YO YO DUCK DIAGNOSTIC PROGRAMS)

* * * MEMORY.TEST * * *

Gives instructions for testing the following memory=

IIe 64K or 128K
IIc 128K
IIGS 256K
IIc Entended Memory
IIe Entended Memory

* * * PRINTER.TEST * * *

This programs tests the computer-printer connection for a variety of printers. When finished you are returned to the main menu. The Version 1 series of this disk has tests for older printers than does this disk.

* * * SPEAKER.TEST * * *

Gives both half and full notes to test speaker.

* * * ZANNY QUIT * * *

Just a different way to quit! There are 3 different random methods.

APPENDIX A

Differences Between Versions

Ver. 2 series and 1.4 series

1. It is under ProDOS instead of DOS 3.3
2. New tests=
   a) ENSONIQ.SOUNDS give a demo of new IIGS sound
3. Changes in existing tests=
   a) DISK.TEST2 is slower under ProDOS
   b) KEYBOARD.TEST takes in account the IIGS and drops the II+.
   c) MEMORY.TEST drops the 48K II+ test and adds many new tests.
   d) PRINTER.TEST drops older printers and adds some.

Ver. 1.4 and 1.3C (DOS 3.3)

1. New tests=
   a) DISK MAP give an ideal of disk space use.
   b) RECOVER brings back some deleted files.
2. Misc=
   a) Minor cosmetics added
   b) A problem with the GS and new IIc ROM fixed.

Ver. 1.3C and 1.2 (DOS 3.3)

1. New tests=
   a) D HI-RES TEST to test double hi-res color.
   b) KEYBOARD TEST to test different keyboards.
   c) IW2 which shows capabilities of the ImageWriter II printer and is used In-house by a company. Some versions may not show this program on the main menu but it will be on the disk.
   d) SPEAKER TEST to test the speaker.
   e) ZANNY QUIT to quit the disk differently.
2. Increased error trapping.
3. Simplification of the number of keys needed in a few of the tests.
4. DISK CLEANER is now called DRIVE CLEANER.
5. COLOR TEST is now called COLOR/B&G TEST and has been increased in power.
6. A small bug is main menu option 2 fixed.
7. More printers tested.
8. Other tests have been enhanced or speed up. i.e.

APPENDIX B

Printing out the file= INSTRUCTIONS in a formatted manner.

This file is a ProDOS ASCII text file. Any word processor like AppleWriter or AppleWorks will print out this file in a formatted manner. For instance- all of the titles of program descriptions are centered and the Table of Contents is nicely spaced out. This does not show when using the disks built-in printing capabilities.

APPENDIX C

Procedures for testing systems.

1. Boot computer

   If computer is a IIe do a self test - which tests ROM / RAM / main memory and the 80 column card. This is done one of two ways. Either hold down both the OPEN-APPLE and CLOSED-APPLE keys when turning on the computer or do a CLOSED-APPLE-CONTROL-RESET if the computer is already turned on. Lift up on the RESET key first.

   If the computer is a new IIc do a self test just like above. The older IIc's do not have a self test built into them.

   If computer is a IIGS do a self test using the OPEN-APPLE / OPTION / CONTROL / RESET. Lift up on RESET first.

2. Put in YO YO DUCK DIAGNOSTIC PROGRAMS and boot computer.

   The sound of the opening menu tests the speaker.

3. For two drive system run main menu option=

   No. 1 - C-D CONNECTION

4. For Black and Green monitor system run main menu option=

   No. 2 - COLOR/B&G TEST and then run suboption=
   No. 5 - B&G TEST

5. For Color monitor system run main menu option=

   No. 2 - COLOR/B&G TEST and then run suboption=
   No. 1 - STANDARD COLOR NAMES

   Go back to main menu and run option=

No. 9 - HIRES TEST and then run suboption=
No. 2 - CROSSHATCH

6. For printers run main menu option=

No. 13 - PRINTER TEST and pick printer to test.

APPENDIX D

Special Installer Version

This disk includes a special test sequence used by computer installers. That is - for those people who deliver a new microcomputer system - put it together - and test it to make sure that it is working. The test will also useful for a quick test of an existing system. The test is for the following computers=

Apple IIe (Enhanced)
Apple IIc
Apple IIGS

Press the SPACE BAR after booting the computer to get to this special test. The test first records what type of computer you are testing and keeps a record of each type so that a total can be printed out at the end of the day.

The tests come quickly one after the other and consists of the following=

C.D.CONNECTION (which you can skip by pressing a 'Q')
COLOR.TEST
CROSSHATCH.TEST
    Character qeneration= Normal
    Flash
    Inverse
    MouseText
    40/80 column ability
PRINTER.TEST (optional and only for the ImageWriter)

At the end of the day Boot up the computer and press the 'P' key for a screen printout of the number of each of the computers you tested. There is an option to reset the number of the computers to zero.

YO YO DUCK DIAGNOSTIC PROGRAMS

Version 1.4 DOS 3.3

© Michael A. Coffey 1984-7

NOTE: Differences between the ProDOS version and this DOS version are listed below. For information on test in both version, refer for the ProDOS version.

Apple II+/e/c

For most tests only 48K is needed. Some require a special set up= such as 128K/ etc. See each test for individual requirements. Early IIc's may not run every test.

Program Descriptions

---

* * * COLOR/B&G TEST * * *

Special requirement= Some options require a Color monitor

These test allow you to test for proper color and has a few goodies for you to play with. The B&G test shows proper NORMAL / INVERSE / FLASH / 40 column / 80 column / MouseText (if you have a IIC or IIE) and a white test for checking for burn spots on the screen. When finished you are returned to the main menu. Some options do not give correct colors on a IIGS.

* * * DISK CHECK * * *

by David Cusimano

This program was created to check a disk for bad disk sectors. To run this program first do ONE of the following=

1. Pick option one from the main menu. or
   Type= BLOAD DISK CHECK and press RETURN

Put the disk you want to check into drive one. Then type the following= CALL 768 and press RETURN

If there are any bad disk sectors the track and sector will be printed out (in HEX- which is a 16 base number system) as=

T__ S__

If there are no bad disk sectors you will see the prompt again. (it looks like=]) To check another disk place it into the drive and type CALL 768

You will not return to the main menu in this option. You must either reboot the computer or type= RUN HELLO2 and press the RETURN key.

* * * DISK MAP * * *

This program will display the currently used sectors on a disk. The first three DOS tracks are marked 'DOS' and the catalog track is marked by a '^'. This routine can also be accessed by a CALL 8192

* * * DISK DOCTOR * * *

NOTE= The most useful utility of this program is option 4 which allows you to remove DOS from a disk. If you use a disk only for data then DOS is occupying space you could use to store data. Some of the other options require advanced knowledge of the Apple.

This is a self prompting DOS 3.3 utility program to aid in diagnosing and recovering disk errors. The following notes should aid you in using the DISK DOCTOR.

1) Display Sectors--Valid tracks are 0-34. Valid sectors are 0-15. The program accepts decimal values only. It will dump a sector to the screen in 40 column format or to printer in 80 column format. It assumes printer is in slot 1.

2) Zap Sector--Track/sector values as per option 1. The sector may be displayed on request. DISK DOCTOR requires the user to know the value of the user to know the value of the byte to be 'zapped'. Sector offset- old value- and new value may be entered in the decimal range 0-255 or hexidecimal range 0-FFK. (prefix hex value with a '$' i.e. $FF) You may change as many bytes as required or change the same byte multiple times. However- DISK DOCTOR will only allow you to change 1 byte at a time.

3) Recover File--Enter the name of a deleted file. DISK DOCTOR will search the directory for a matching name that has been deleted- and if found- DISK DOCTOR will recover it. If no matching deleted file is found no action is taken. NOTE= you must load and save the file to complete the recovery as disk doctor does not fix the VTOC map.

4) Remove DOS--This option releases the DOS sectors in the VTOC and places a mini boot routine on track 0 sector 0. Removing DOS from a disk frees up two usable tracks (1 & 2) resulting in a gain of 8k. Track 0 is made available but DOS will not use track 0 as a data track.

5) Set Slot and Drive--Valid slot values are 0-7 valid track values are 1 or 2. Slot and drive changes are only changed for the duration of the DISK DOCTOR session. When you end DISK DOCTOR the slot and drive values revert to the values in effect at the beginning of the session.

6) End--Terminates the program. When finished you are returned to the main menu.

NOTE= If you are not familiar with apple DOS's disk format- DISK DOCTOR can do as much damage as it can repair. I recommend you become familiar with DOS and the DISK DOCTOR using an expendable disk first!

* * * DRIVE SPEED * * *

Special requirements= small screw driver
64K- may not work early IIc
Does not work for 3.5 inch drive

Drive speed is critical for many commercial programs. This program allows you to test it. The place for adjustment varies
on different models and makes. Check your manual for the correct place.

Put in an initialized blank disk- or one that do care if data will be destroyed. Running this program wipes out any data on part of the disk.

Drive speed should be as near 0 as possible. BASIC programs require a setting near 0 but some languages and many copied protected programs require an almost perfect 0 reading for the drive speed. It is normal for there to be some variation of drive speed while the drive is running. When finished you are returned to the main menu.

* * * INSTRUCTIONS * * *

This file is the documentation you are now reading. There is an option for printing out this file on the screen or to a printer. Neither of these use any formatting commands. For instructions on printing out this file in a formatted manner= see Appendix B. When finished you are returned to the main menu.

* * * KEYBOARD TEST * * *

The correct keyboard for the Apple II+ / IIe / IIe Enhanced / IIc is shown- allowing you to test for bad keys. When finished you are returned to the main menu.

* * * IW2 * * *

This is a special In-house program for a company to show some of the capabilities of the ImageWriter II printer. When finished you are returned to the main menu.

* * * PRINTER TEST * * *

This program tests older printers than the ProDOS version.

* * * RAM TEST 48K * * *

This program tests the RAM portion of the first 48K of memory in any Apple II series computer. If a bad memory chip is found the location of the chip is printed on the screen. The

program will continue to test the memory chips repetitively until CONTROL-C is pressed. When finished you are returned to the main menu.

* * * RECOVER * * *

by John Uhley

This program tries to recover a deleted file. Of course you should have had a backup!

* * * SYSTEM CONFIG. * * *

This program tells you what computer you have / i.e.

Apple II
Apple II Plus
Apple III (emulation)
Apple IIe (original)
Apple IIe (enhanced)
Apple IIc (original)
Apple IIc (32K ROM)
Apple IIc (Mem. Exp.)
Apple IIGS
Ace 100
Ace 1000/1200
Ace 500
Ace 2000 (5.2 ROM)
Ace 2000 (6.0 ROM)
Laser 128

and what 'cards' are placed in slots inside the computer. It does not notice or will mis-id many of the new cards since there are hundreds on the market. When finished you are returned to the main menu. If you know the ID Bytes and Byte ID Location of a card please send them to me.

APPENDIX A

Differences between Ver. 2.x and Ver. 1.x series

In comparing Ver. 2.x

1. It is under the ProDOS operating system as compared to DOS 3.3 of the Ver. 1.x series.
2. Many of the test are the same or have an equivalent but new tests have been added for the IIGS computer and for new hardware such as memory expansion cards.
3. The PRINTER TEST has more recent printers.

Differences between Ver. 1.4 and 1.3D

1. A bug concerning the IIGS and enhanced IIE has been fixed.
2. New tests have been added=
   a) DISK MAP
   b) RECOVER
3. Some minor cosmetics have been done.

Differences between Ver. 1.3D and 1.2

1. New tests=
   a) D HI-RES TEST to test double hi-res color.
   b) KEYBOARD TEST to test different keyboards.
   c) IW2 which shows capabilities of the ImageWriter II printer and is used In-house by a company. Some versions may not show this program on the main menu but it will be on the disk.
   d) SPEAKER TEST to test the speaker.
   e) ZANNY QUIT to quit the disk differently.
2. Increased error trapping.
3. Simplification of the number of keys needed in a few of the tests.
4. DISK CLEANER is now called DRIVE CLEANER.
5. COLOR TEST is now called COLOR/B&G TEST and has been increased in power.
6. A small bug is main menu option 2 fixed.
7. More printers tested.
8. More computers are ID'd in SYSTEM COFIG.
9. Other tests have been enhanced or speed up.

APPENDIX B

Printing out the file= INSTRUCTIONS in a formatted manner.

This file is a DOS 3.3 ASCII text file. Any word processor like Magic Window- will print out this file in a formatted manner. For instance- all of the titles of program descriptions are centered and the Table of Contents is nicely spaced out. This does not show when using the disks built-in printing capabilities.

5 1/4" Disk Drive Speed Adjustment
(Apple compatible computers)

1. Turn off the power to your computer.

2. Find the drive speed adjustment screw on your type of drive.

   Unidisk, Duodisk - Screw is on the bottom of drive near the front, through a small hole.
   Drive II and clones - Remove the drive cover. There are four (4) small screws on the bottom of Apple drives or on the side of Micro-Sci A-2 drives. After removing them, the cover may be slid off towards the back of the drive. The drive speed adjustment screw can be found on the smaller printed circuit board at the back of the disk drive.

   IIc external clones - either on the bottom, through a small hole, or under one of the 'feet'

3. Boot your YO YO DUCK DIAGNOSTIC PROGRAMS Ver 1 series, or Copy][Plus diskette, selecting the proper verify disk speed option, or another disk with a drive speed adjustment program.

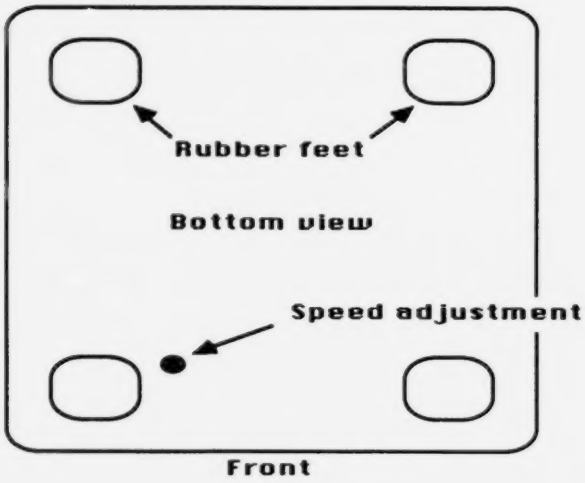
4. The drive speed can be varied by turning the speed control potentiometer. Using a small screw driver, adjust your speed.

5. When the speed is adjusted within the above range, you can then re-install the cover on your disk drive.

The drive speed adjustment is by far the most frequent adjustment necessary for drives, and even the entire computer. As the drive gets older, the speed gradually increases. (It breaks in, and there is less friction.)

Use the brand of diskette that you normally use for doing a speed check. The friction levels of different brands <u>are</u> different. Also, the friction level will vary a bit from lot to lot from the same manufacturer.

© Michael A. Coffey 1987

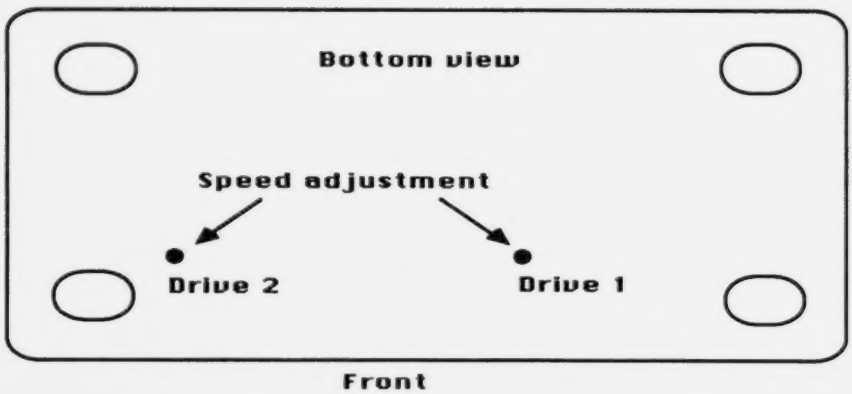


APPLE

UNIDISK 5.25
APPLE 5.25 DR

APPLE

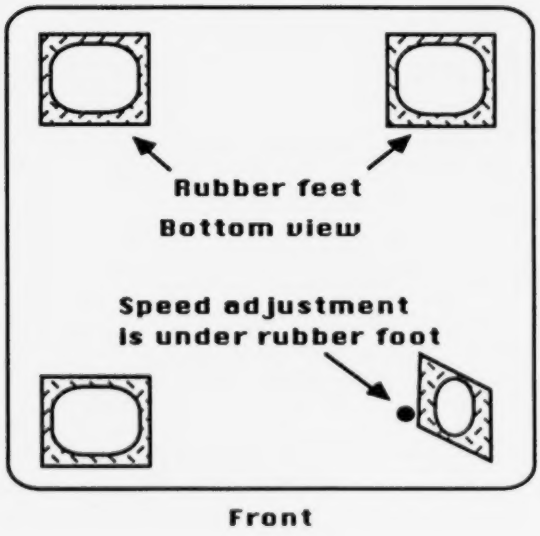
Duodisk



© Michael A. Coffey 1987

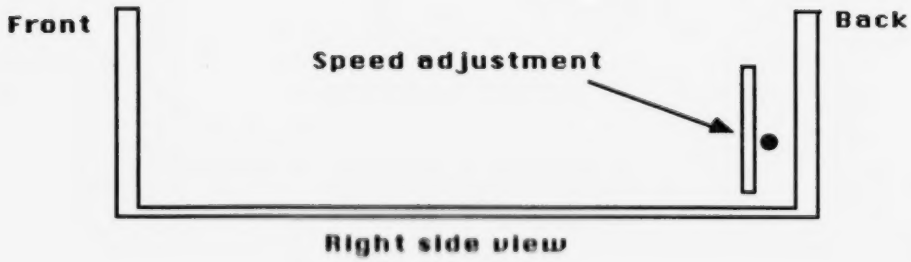
APPLE

GAMMA //c
LASER //c



APPLE

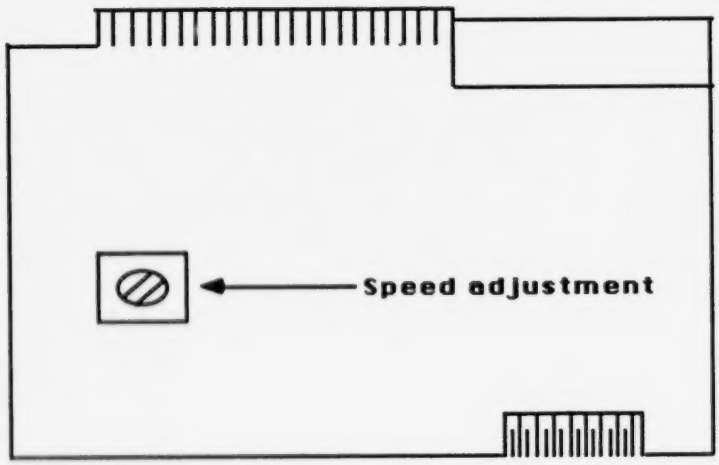
Disk II



© Michael A. Coffey 1987

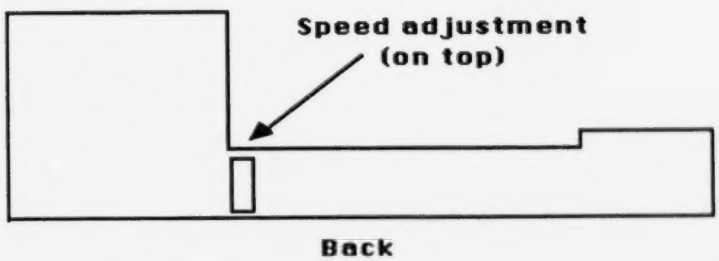
IBM

CDC DRIVE



IBM

TANDON DRIVE



© Michael A. Coffey 1987

MAINTENANCE SOFTWARE / HARDWARE REFERENCES

Rev. 10/87

A	=	Apple II / III
C	=	Commodore (C64 / 128)
I	=	IBM PC / Jr
M	=	Macintosh
T	=	TRS 80
+++	=	most computers
---->	=	see description

1. Programs to check drive speed:

Bit copy programs

A 1) Locksmith by Omega MicroWare $100
A 2) Nibbles Away II by COMPUTER:application $80
A 3) EDD by Utilico Software $80
A 4) Copy][Plus V4.X by Central Point Software $40
A 5) Back It Up III by Sensible Speller $80

Non-bit copy programs

A I 1) The Filer by Central Point Software $20
----> 2) Datalife Disk Drive Analyzer by Datalife $40 Checks Apple II series, Apple III series, IBM PC, XT for alignment, speed, read/write ability and clamping accuracy.

2a. Computer Diagnostic programs:

A a) Master Diagnostics //+ or //e by Nikrom Technical Products $55
A b) XPS-Diagnostic by XPS $50
A I c) Computer Checkup by Power Up! $50 - $60
A d) Appletest by Dynacomp $20
C e) 64 Doctor (disk and tape) by Computer Software Associates $29.95
----> f) Diagnostics II by SuperSoft $125 For Apple, TRS 80 Mod II with CP/M, IBM, and most CP/M, CP/M-86, and MS DOS systems.
C g) Mr Tester by Micro-W $29.95
I h) Memtest (checks memory up to 1Mb, uses DOS 1.1; DOS 2.x; CPM-86) by Frontier Technologies Corp $25.
A i) ACT II (Apple/Clone Testing) by Micrologic Systems $29.95

2b. Disk Drive Diagnostic programs:

A a) RID (recording interchange diagnostic disk for drives) Dymek Corporation, 1851 Zanker Road, San Jose, CA 95112 $34.95
I b) Disk P.M. (Disk Preventive Maintenance) Digital Pathways $49.95
----> c) Diskette Diagnostics (for checking 5 1/4 and 8" drives) by Flagstaff Engineering $195.

© Michael A. Coffey 1987

+++ d) ReadiScope (makes adjustments to head & spindle alignment without special equipment or skills) by Readiware Systems Inc $295.

A e) APTEST by Apple PugetSound Program Library Exchange (A.P.P.L.E.) Club (available to club members only)

I f) DDA (Disk Drive Analysis program) by J & M Systems

I T g) Memory Minder by J&M (also for some IBM compatibles) $79 - $129.

I h) HDTEST for IBM style hard disks, Gallery 6 Distributed by Proto PC, 2439 Franklin Ave, St. Paul, MN 55114

3. Cleaning Kits:

+++ a) PC-board-cleaning kit from Jensen Tool Catalog 7815 S 46 St., Phoenix, AZ 85040 $9.95

+++ b) Case for Computer Care (contains disk head cleaner, printer cleaners, antistatic spray, etc, in a case) $49.95 from Perfect Data Corp., 9174 Deering Avenue, Chatsworth CA 91311

c) Mini-Vac - The Pine Cone $29.95

d) The Mouse Cleaning Kit by Nortronics $17.95

+++ e) Read/Right Microcomputer Cleaning Kit by The Texwipe Company

4. Computer Repair Kit:

A a) The Repair Kit for Apple II+ $39.95 Quantix, PO Box 67, Richton Park, IL 60471

I b) PC Tool Kit from MicroComputer Accessories Inc, 5721 Buckingham Pkwy., Colver City, CA 900231 This is a 11 piece kit for $29.95 designed to cope with the typical adjustments or repair problems confronting a PC user.

5. Disk Cleaners:

+++ a) Dust-Off II by Falcon Safety Products, Inc.

6. Drive Head Cleaners:

3 = 3 1/2" 5 = 5 1/4" 8 = 8"

3 a) Flexible Head Cleaning Disk (single & double side) $39.95 from Vikor Company Inc., PO Box 3123, Nashua, NH 03061

5 b) Head Cleaning Kit by Omnium, 201 North Second Street, Stillwater, MN 55082 $49.95; $29.95 for replacement kit.

5 c) Datalife Head Cleaning Kit by Verbatim

5 d) Discwasher Clean Runner by Discwasher $20 for 20 cleaning operations.

3 5 8e) Floppiclene by Automation Facilities Corp.

A I f) Disk Head Cleaning System by Nortronics $29.95

7. Static Control:

a) Dust-Off II (removes dust, lint from hardware) by Falcon Safety Products, Inc. $24.95; $4.75/refill.

b) Staticide (for floors and carpeting) by ACL

c) Staticide Wipes by ACL

d) Antistat (for carpeting) by National Systems Corp.

e) ScreenSafe (for monitor screens) by Falcon Safety Products Inc $12.95

f) Screen Kleen Dust Cloth (for monitor screens) $2.95/2 pack by M W B Industries Inc.

g) Stat-Off II (an accessory for Dust-Off II; produces an ionized blast to neutralize charges on equipment) $17.95 by Falcon Safety Products Inc.

© Michael A. Coffey 1987

h) Take Charge Static Strip (mounts on keyboard and dissipates static charge.) $14.95 by WattsOUt Inc

i) Master Piece, surge, RFI, EMI protection, master switch, monitor swivel. by Kensington

j) ACL Electrostatic Locatorm Model 300, measures static charge. ACL In., 1960 E. Devon AVe, Elk Grove Village, Il 6007 (312) 981-9212 $299.95

8. Fans for Computers:

A a) Cool-Mark II - Mark Four Imports
A b) Cool + Time - Tencal, Inc.
A c) Cooling Fan - Shellner
A d) Super Fan II - RHElectronices, Inc
A e) System Saver - Kensington Microware, Ltd.
I f) PCool - Analytic Information Processing
I g) ABC computer Peripherals, Inc.
A f) The Fan - Kemcore Company $15
M h) Fanny Mac, reduce temp by 50 degrees, Beck-Tech, 41 tunnel Road, Berkeley, CA 94705
I i) Turbo-Cool (formerly known as Silencerm model HP), bolts onto back of PC, PC Cooling Systems, 31510 Via Ararat, Bonsall, CA 92003 $80
M j) System Saver Mac - Kensington Microware, Ltd.

9. Printer Inkers:

+++ a) Ebonize Printer Ribbon Ink Spray
+++ b) MacInker (Universal Spool and Universal Cartridge versions) price about $60 by Computer Friends
M c) Ribbon Re-Inker for ImageWriters: Bede Tech, 8327 Clinton Road, Cleveland, Ohio, 44144 800-772-4536

ADDITIONAL ADDRESSES

Computer Friends, 6415 SW Canyon Court Suite #10, Portland, Oregon 97225 (800) 547-3303
J&M Systems, 15100-A Central S.E., Albuquerque, NM 87123 (505) 292-4182.
The Texwipe Company, 650 E. Crescent ave., P.O. Box 575, Upper Saddle River, NJ 07458 (201) 327-9100

© Michael A. Coffey 1987

Rules For Repair

When things do go wrong, you will find it easier to go about solving them methodically. We have to look at all the possible things that could have gone wrong, then narrow them down through the process of elimination. Sometimes what looks wrong on the screen is a symptom of something happening somewhere else in the system.

1. **Don't panic.**

   Most problems are simple and you now know something about repair.

2. **Observe the conditions that exited at the time of the problem. Defining the problem is often the most difficult part of solving it. Ask yourself the following:**

   What actually was the computer or device doing?
   Was the power light on or off?
   What program was running?
   What was on the display screen?
   Was a peripheral being used?
   Was an error code displayed?
   Could it have been caused by operator error?
   Is it an intermittent failure?

3. **Verify the failure if possible.**

   Some problems are caused by random factors that will not happen again unless there is a Blue Moon, Friday the 13th and you got up on the wrong side of the bed.

4. **Verify the following:**

   Does the software require additional hardware?
   Is the software being used the correct version and any needed installation / configuration is correct?

5. **Use your senses and check for anything burning or hot pieces of equipment.**

   Does anything feel overly hot or have a particular smell?

6. **Retry.**

   Try to duplicate the problem using the same equipment.

7. **Document the preceding steps.**

   You might forget something that will help the technical fix the problem easier.

8. **Assume one problem.**

   Unless something unusual has happened, only one part has gone bad.

9. **Diagnose to a section (fault identification).**

10. **Localize to a stage (fault isolation)**

11. **Isolate to a failed part (fault isolation)**

D-1

© Michael A. Coffey

CAUTIONS ON COMPUTERS

1. Never insert or remove a peripheral card without first turning off the power, removing the lid, touching the top of the power supply.
2. Beware of static electricity. Ground yourself first before looking inside a computer.
3. Keep out of the monitor and power supply.
4. Follow the Rules For Repair.
5. Never touch contacts with your fingers.
6. Use a surge protector.
7. Clean the computer periodicly and in a proper manner.
8. Keep cables and cords in their place.
9. Keep a log of any repair work done, or problems that occur.
10. Keep you disks stored properly.
11. Implement a Preventive Maintenance Program.

© Michael A. Coffey

General Troubleshooting

SYMPTON	CORRECTIVE ACTION
VIDEO PROBLEMS	
No or poor video display.	1. Reseat cable. 2. Replace cable from known working system and test. 3. Adjust brightness. 4. Adjust contrast. 5. Verify that the software supports the monitor i.e. RGB 6. Verify Control Panel setting for video on IIGS. 7. Test system with a known working monitor.
No color.	1. Verify any color / monochrome switch settings. 2. Verify Control Panel setting for video on IIGS. 3. Verify MODE for IBM style computers.
Wrong output is displayed.	1. Verify Control Panel setting for correct language selection on IIGS. 2. Exchange Apple DeskTop Bus cable on IIGS. 3. Verify MODE for IBM style computers. 4. Check Keyboard switch is up on IIc.
DRIVE PROBLEMS	
Disk write protected.	1. Remove write protect tab from 5.25" disk or flip tab on 3.5" disk. 2. Check write protect switch in drive.
I / O error.	1. Verify that disk is formatted correctly. 2. Reseat disk, verify correct side is inserted into drive and drive door is properly closed. 3. Verify disk is good. 4. Verify drive speed. 5. Verify drive alignment. 6. Clean drive heads. 7. Verify Control Panel settings for correct slot assignment on IIGS.

© Michael A. Coffey 1987

8. Clean disk drive interface connection on any open system.
9. Does software require additional hardware?
10. If a BASIC program, does the disk have BASICA, GWBASIC, etc on it for IBM style computers or BASIC.SYSTEM if an Apple ProDOS disk?
11. Check for memory resident program conflict on IBM style computers.
12. Check for latest version of System and Finder on Macintosh.

PERIPHERAL PROBLEMS

Keyboard does not work.

1. Replace cable and test.
2. Replace keyboard and test.
3. Clean key switches.

Joystick - no response.

1. Replace and test.

No audio.

1. Verify Control Panel settings for sound on IIGS.
2. Adjust sound switch on IIc or other computers.

PRINTING PROBLEMS

Not printing.

1. See ImageWriter II discussion.
2. Verify if program is compatible with computer, any interface card, etc.
3. Verify all configuration settings on: software, printer, interface card.
4. If new, check for unremoved packing.
5. Verify printer with self test.
6. Do you have the correct printer interface?

MISCELLANEOUS PROBLEMS

No power, nothing works.

1. Verify power cord plugged into working outlet.
2. Verify power supply working.
3. Verify power cord working.

Power, but not booting.

1. Verify operating system is on disk.
2. Verify disk is good.
3. Verify version of operating system works on that computer.
4. Check for latest version of System and Finder on

© Michael A. Coffey 1987

Macintosh.

Computer locks up.

1. Replace with known good disk and test.
2. Test program on anther computer or use another copy of program and test.
3. Debug your own program.
4. Check for latest version of System and Finder on Macintosh.

Computer does self test but system does not boot.

1. Verify that the system works by booting a known good disk such as the system master (system utilities, User disk, etc.) that came with the computer.
2. Reseat disk and retry.
3. On IIGS, verify Control Panel settings for correct slot assignment.
4. Check operating system. On IIGS, the following does not work: a) DOS 3.2 (replaced in 1981 with DOS 3.3) and b) Apple Pascal V1.1 or earlier.
5. On IIGS, check disk on an Apple IIe or IIc or II+. The disk copy protection scheme may be incompatible.
6. Verify any configuration settings are correct.
7. If an IBM style disk, is the correct 360K or 720K or 1.44K format?

© Michael A. Coffey 1987

For more information

about MSBA's Computing and Technology Services,

Call:

Rick Mihalevich, Director
or Mike McClaskey, Coordinator
1-(800)-221-MSBA (672)
1-(314)-445-9920

or Write:

Computing/Technology Services
Missouri School Boards Association
2100 I-70 Drive Southwest
Columbia, MO 65203

For additional copies of the diagnostics disks and access to other IBM public domain software, use your modem to call:

EDNET (a part of MSBA's electronic information service)
1-314-445-9981
300/1200/2400 bps, no parity, 8 data bits and 1 stop bit